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DROP AND STATION MAINTENANCE

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1. GENERAL

- 1.1 This section discusses routine procedures for maintaining drop and block wiring, inside wiring and station apparatus.
- 1.2 It is important that care be exercised in planning maintenance calls in order to hold cost to a minimum and still render satisfactory service.
- 1.3 Routine procedures should be established which require that a line in trouble be given a series of tests from the central office. Tests should be made for leakage resistance, shorts, crosses, opens and grounds to determine the exact nature of the trouble and its approximate location. This procedure will also provide information as to any other trouble condition on the line which can be cleared while in that area. Reference to loop and equipment data and previously recorded troubles on the line and station card will assist in analyzing trouble.
- 1.4 After completion of the tests, central office trouble should be cleared and then a trouble route established. If the number of outside trouble cases do not represent a full day's work, consideration should be given to combining subscriber's service order completion work and preventive maintenance work along the same route or in the same area. Thoughtful planning and routing will save many miles of driving and associated transportation costs.

2. DROP AND BLOCK WIRING INSPECTION AND REPAIR

- 2.1 Before entering the subscriber's building, the repairman should inspect the drop wire, station protector, ground, and all connections. A test call from the protector will check the circuit continuity. If this test call cannot be completed, a call from the pole should be made. If it is necessary to climb a pole, all equipment on that pole should receive inspection. Care

should be taken to replace wires in the positions occupied before removal. Reversal of the positive (tip) and negative (ring) sides will result in incorrect ringing when divided signalling is used.

2.2 All insulating devices used in attaching drop wire to the building should be tightened, if loose, and should be replaced, if broken.

2.3 Sources of trouble to be checked in drop wire inspection are:

- a. Loose connections at junction of drop wire and line wire, cable terminal, wire terminal, or station protector;
- b. Slipped clamp or tie at pole or house;
- c. Mechanical injury or weather deterioration of insulation;
- d. Loose or broken knobs, cleats or insulated screw eyes;
- e. Improper sagging or routing of drop wire;
- f. Lack of tree clearance or tree guards where trimming cannot be done.

3. INSIDE WIRING AND EQUIPMENT INSPECTION AND REPAIR

3.1 Complete inspection and repair of inside wiring should be made, damaged sections repaired and loose sections refastened.

3.2 The telephone instrument should be completely inspected. All screw connections and mounting screws, soldered joints and cords should be checked for good electrical contacts and firm mounting of the various parts.

3.3 Dials should be checked for needed lubrication, speed, and spring alignment. Defective dials should be replaced and necessary repairs performed in the shop.

3.4 The switchhook plunger should be checked for free operation. The switchhook contacts should be inspected for proper action. Contacts can be cleaned with a smooth burnishing tool operated between the contacts when in make position. Care should be taken not to disturb the spring tension or distort the springs.

- 3.5 Ringers sometimes require adjustment but before attempting adjustment other causes of no-ring or poor-ring should be explored. There might be a faulty station ground if divided ringing is employed, a partial ground on one or both sides of the line, a high resistance line joint, or a poor connection in the drop or inside wiring. When it is determined that ringer adjustment is necessary, the manufacturer's adjustment instructions should be carefully followed.
- 3.6 Cross ringing may be encountered on loops with divided ringing. This condition is indicated when rings for one party are received by the party on the opposite side of the line. Cross ringing may be caused by crossed open wire conductors, reversed line conductors, short circuits, grounds on both sides of the line, or high resistance ringing grounds.
- 3.7 When frequency ringing is used, "ring-over" (bell tapping or tingling in response to another frequency) might be experienced. This can sometimes be remedied by increasing the space between the gongs but spacing should not be so great as to decrease the volume of the ringer when responding to its own frequency.
- 3.8 Under certain conditions bell tapping is experienced on one telephone due to dialing by another subscriber on the same line. This situation usually arises on bridged ringing loops and when extension stations or extension bells are utilized. The condition can sometimes be remedied by reversing the leads to the ringer, increasing spacing between the gongs, increasing the tension of the biasing spring where used, or all three.
- 3.9 The receiver cap and mouthpiece should be removed and any foreign matter eliminated. Cord connections should be tightened and the spring tensions of the transmitter and receiver contacts observed.
- 3.10 Company policy in respect to attachments should be followed and if any unauthorized attachments are found on trouble visits, they should be removed and the reason tactfully discussed with the subscriber.

4. TESTS—SUBSCRIBER STATIONS

- 4.1 Before leaving the premises, tests should be completed to determine if the equipment is functioning properly. These should be conducted with the test desk or wirechief, if

available. If not, they can be conducted from the subscriber's telephone as follows:

- a. Dial a reverting call to test the dial, ringer, and ringing signal cutoff relay.
- b. Dial the business office, "information", or "long distance", whichever is available, for a "call back". This will serve to test transmission as well as incoming equipment operation.
- c. If the station being tested is on a full-selective signaling party line, dial the opposite party to determine if cross ringing exists. Ringing digits 1 & 6, 2 & 7, 3 & 8, 4 & 9, and 5 & 0 indicate opposite parties. Also dial other stations on the same side of the line to test for "ring-over". It is necessary to test other stations using frequencies which are direct multiples of the ringer being tested. (Frequencies such as 20-40, 25-50, 30-60, 16 $\frac{2}{3}$ -33 $\frac{1}{3}$, etc. are direct multiples.)

5. PAYSTATION INSPECTION AND REPAIR

- 5.1 Generally procedures outlined in paragraphs 3 and 4 also apply to the inspection and repair of paystation instruments and in addition routines outlined in the following paragraphs should be followed.
- 5.2 Semi-public and public telephone subscribers should be supplied with "temporarily out of service" signs. When trouble is cleared signs should be returned to the subscriber. The signs can be either a printed card with a string loop or an aluminum plate with loop to slip over coin slots.
- 5.3 Maintenance men should be equipped with keys to the upper housing so repairs can be made without delay.
- 5.4 If the coin receptacle is full, the trouble can be temporarily cleared by inserting a piece of line wire about eight inches long, with about one inch of the end to be inserted bent at a right angle, through the hole in the right side of the coin relay tray and leveling the coins in the receptacle.
- 5.5 Defaced and mutilated instruction cards and directories should be replaced.
- 5.6 The coin gauges should be inspected for foreign matter and wiped out with a cleaning cloth saturated with carbon tetrachloride.

- 5.7 No attempt should be made to take the coin chute apart or to straighten distorted chutes.
- 5.8 To clean the coin chute remove the chute assembly from the upper housing. Brush off any loose dirt or dust with a cleaning brush. A chute cleaner can be made from a piece of #14 bare copper wire about 12 inches long. Place a piece of cotton sleeving over the wire and bend to form a parallel with about 3/8 inch between the wires. This cleaner can be formed to reach all parts of the chute. Use carbon tetrachloride to aid in removing sticky substances from coin runways.
- 5.9 Check for loose gongs. Check cords. Cords should be secured so they do not come in contact with gongs nor obstruct the passage of coins.
- 5.10 Clean coin trap, coin vane, etc., with lintless cloth or tubing over wire, screwdriver or other applicable tool.
- 5.11 Contact springs should line up and have a perceptible follow. The contacts should be clean and can be cleaned with a burnishing tool. Spring contacts should be adjusted according to the manufacturers' specifications. Necessary tools are a spring bender and a gram tension gauge.
- 5.12 Coin relay contacts can be cleaned with cleaning paper inserted between the contact points, gently pressing the points together and withdrawing the paper. This should be repeated with clean paper until the paper shows no sign of dirt.
- 5.13 Armature and pole pieces should be inspected for magnetic particles. If any are noted they can be removed by placing a piece of rubber tape between the armature and pole piece and manually operating the armature to exert pressure against the tape.
- 5.14 If paystation is located in a booth, all features of the booth and special fittings should be inspected whenever a visit to the station is made by a maintenance man.

6. TESTS—PAYSTATIONS

- 6.1 Testing to determine that the coin collector housing is not crossed with the wiring may be accomplished as follows: pass a short length of insulated wire through the return chute and

attach it to the ground terminal on the terminal block. Lock the upper housing in place and remove the receiver. Connect one clip of a hand testset to the other end of the wire, and with the other clip touch various parts of the coin collector such as the coin gauge, coin return chute or dial finger stop. If a battery click is heard in the test receiver, the coin collector is crossed with the wiring.

- 6.2 To test for coin signals, call the operator, advise that you want to test coin signals, and then deposit a nickel, dime and quarter and see if the operator identifies each coin properly. If operator does not identify coins, repeat and if still not identified, check for loose gongs and turn solid gong to a different position if better signal can be obtained. If signals are still not identified, replace the coin signal transmitter. If still not identified, replace upper housing.
- 6.3 To test for noise and cutouts, while talking to the test desk or operator, move upper housing up and down and from side to side. No noise or cutouts should develop and pressure between housing and equalizing spring, and housing and contact springs should be approximately equal as determined by feel.